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FROM : [redacted] STAT

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SUBJECT : CURSORY CHECK OF CV-5 CONVERTER

1. THE CV-5 CONVERTER WAS SUBJECTED TO A CURSORY EVALUATION BY THE A&A SECTION, R&D LABORATORY.

2. THE EVALUATION INCLUDED MEASUREMENTS OF:

(1) CV-5 10 db S/N SENSITIVITY.
(2) RAW NOISE OUTPUT.
(3) CV-5 INPUT POWER REQUIREMENTS.
(4) COMBINED RECEIVER/CONVERTER USEABLE BANDWIDTH.
(5) CV-5 INTERNAL SPURIOUS RESPONSE.
(6) CV-5 RESPONSE TO UNWANTED SIGNALS.
(7) TEST RECEIVER RESPONSE TO UNWANTED SIGNALS.

3. FOR COMPARISON THE CV-2A ELECTRICAL CHARACTERISTICS ARE NOTED IN THE "SUMMARY OF THE TESTS" PARAGRAPH 4.

This document is part of an integrated file. If separated from the file it must be subjected to individual systematic review.

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4.2. CV-5 10 db S/N SENSITIVITY

TEST RESULTS :

CV-5 10 db S/N SENSITIVITY

LOW BAND 3-12 MC			HIGH BAND 12-30 MC		
CRYSTAL FREQ. MC	SIGNAL FREQ. MC	10 db S/N SENSITIVITY MICROVOLTS	CRYSTAL FREQ. MC	SIGNAL FREQ. MC	10 db S/N SENSITIVITY MICROVOLTS
4.500	3.000	3.0	5.000	11.500	4.7
5.500	4.000	2.3	5.500	12.500	3.9
8.500	5.000	2.2	6.000	13.500	4.1
9.500	6.000	2.3	6.500	14.500	4.0
8.500	7.000	3.0	7.500	16.500	4.7
6.500	8.000	3.0	8.500	18.500	4.6
7.500	9.000	2.7	10.195	21.890	4.8
8.000	9.500	2.9	11.057	23.604	4.3
8.500	10.000	3.0	12.005	25.510	4.6
9.205	10.705	3.0	13.076	27.652	4.6
10.195	11.695	3.8	14.230	29.996	6.1
12.005	13.505	13.0	15.000	31.500	6.5

NOTE 1: CV-2A TYPICAL SENSITIVITY, 3-12MC = 6.85 MICROVOLTS.

NOTE 2: THE RECEIVER 10 db S/N SENSITIVITY WAS MEASURED AT 1500KCS; RECEIVER GAIN WAS ADJUSTED TO 5.0 MICROVOLTS.

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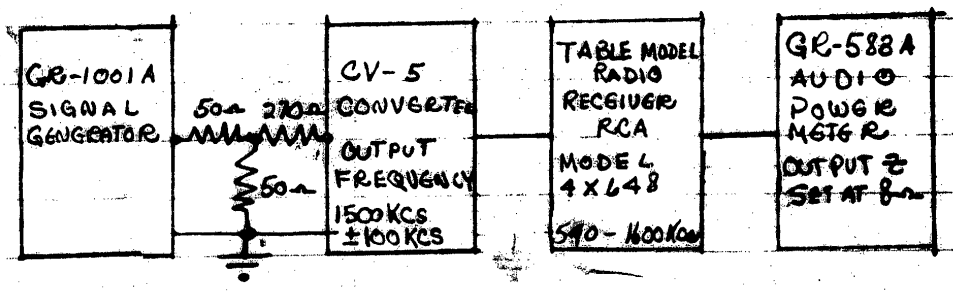
4. SUMMARY OF TESTS.

4.1. CV-5 10 db S/N SENSITIVITY

TEST SETUP:



TEST CONDITIONS: FT-243/CR18 CRYSTALS IN THE RANGE OF 3.5-15mc WERE USED; RECEIVER FREQUENCY WAS 500 Kcs; RECEIVER GAIN WAS ADJUSTED.

TEST METHOD:

(1) AT EACH TEST FREQUENCY, THE SIGNAL GENERATOR OUTPUT, MODULATED 30% WITH 1000 CPS, WAS REQUIRED TO RAISE THE RECEIVER AUDIO OUTPUT POWER 10 db ABOVE THE CARRIER PLUS NOISE REFERENCE LEVEL OF .01 MILLIWATT WAS MEASURED.

(2) SELECTED FOR THREE REASONS:

(1) FOR CONFORMITY WITH DESIGN SECTION TEST PROCEDURE.

(2) BECAUSE A 10 db INCREASE IN MODULATED CARRIER INPUT PRODUCED A USEABLE 1 MILLIWATT RECEIVER AUDIO OUTPUT.

(3) TO PREVENT RECEIVER FRONT END LOADING DUE TO THE HIGH GAIN OF THE CV5 CONVERTER.

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4.3. RAW NOISE OUTPUT

TEST METHOD:

THE RAW NOISE OUTPUT OF THE CV-5 CONVERTER AND RECEIVER COMBINATION WAS MEASURED AT 30 MC WITH THE RECEIVER GAIN SET AT MAXIMUM AND WITH A CARBON RESISTOR OF 270 OHMS SHUNTING THE INPUT TERMINALS OF THE CONVERTER.

TEST RESULTS:

THE RAW NOISE OUTPUT OF THE CONVERTER AND RECEIVER MEASURED 72.2 milliwatts AT 30 MC.

THE RAW NOISE OUTPUT OF THE RECEIVER MEASURED 16.6 MILLIWATTS AT 1500 KCS.

NOTE: RAW NOISE FIGURES FOR THE CV-2A ARE NOT AVAILABLE.

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4.4. CV-5 INPUT POWER REQUIREMENTS

THE DC INPUT TO THE CV-5 MEASURED 1.5 VOLTS @ 1.34 MA. OR 2.01 MILLIWATTS.

NOTE: CV-2A - DC INPUT MEASURED 1.44 VOLTS @ 0.33 MA OR 0.4752 MILLI WATT.

4.5. COMBINED RECEIVER/CONVERTER BANDWIDTH (KC)

THE USEABLE BANDWIDTH, MEASURED AT THE 6 db POINTS, OVER WHICH THE CV-5 CAN BE TUNED ABOVE/BELOW THE TEST FREQUENCY (5.0MC) AND THE RECEIVER CAN BE TUNED ABOVE/BELOW THE DIAL FREQUENCY (1500KC) IS 200 KCS.

NOTE: NO FIGURES FOR CV-2A.

4.6. CV-5 INTERNAL SPURIOUS RESPONSE

THE CV-5 DID NOT EVIDENCE RESPONSE TO INTERNALLY GENERATED SPURIOUS FREQUENCIES.

NOTE: CV-2A - NONE.

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4.1, RESPONSE TO UNWANTED SIGNALS

CV-5 RESPONSE TO UNWANTED SIGNALS

TEST FREQ. 5.0MC LOW BAND		TEST FREQ. 13.0MC HIGH BAND	
UNWANTED SIGNAL FREQ. MC	* UNWANTED SIGNAL ATTENUATION IN (db) BELOW RESPONSE AT TEST FREQ. (0 db)	UNWANTED SIGNAL FREQ. MC	* UNWANTED SIGNAL ATTENUATION IN (db) BELOW RESPONSE AT TEST FREQ. (0 db)
0.710	36.88	1.350	38.26
0.829	37.62	1.470	39.59
1.240	29.20	1.500	37.62
1.645	22.60	1.685	36.88
2.480	23.96	1.935	35.84
5.100	32.86	2.260	37.89
8.450	35.56	2.710	33.98
		3.380	21.88
		* 4.498	14.88
		5.500	33.06
		* 6.740	20.00
		8.240	37.19
		14.20	38.06
		16.45	31.36
		28.40	35.12
		31.30	33.98

* RESPONSES TO UNWANTED SIGNALS WHICH WERE ATTENUATED 40 db WERE NEGLECTED.

NOTE: CV-51 RESPONSE TO UNWANTED SIGNALS IS COMPARABLE TO CV-2A RESPONSE.

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4.8. RCA MODEL 4X678 TABLE MODEL RECEIVER RESPONSE TO UNWANTED SIGNALS

UNWANTED SIGNAL FREQ. MC	UNWANTED SIGNAL ATTENUATION IN (db) BELOW RESPONSE AT TEST FREQ. (0-db)	UNWANTED SIGNAL FREQ. MC	UNWANTED SIGNAL ATTENUATION IN (db) BELOW RESPONSE AT TEST FREQ. (0-db)
0.072	58.5	1.66	66.0 +
0.075	58.1	1.73	55.5
0.079	57.7	2.43	45.0
0.084	57.7	3.46	62.1
0.088	56.4	8.32	66.0 +
0.095	56.1	9.35	66.0 +
0.103	55.2	26.9	66.0 +
0.108	55	28.9	66.0 +
0.116	52.0	29.7	64.7
0.125	52.0	30.9	62.3
0.137	50.4	31.8	60.5
0.151	50.1	32.8	60.6
0.189	53.3	33.8	61.6
0.216	49.4	34.8	59.3
0.230	57.7	35.6	62.7
0.252	52.0	36.6	62.5
0.302	46.8	37.4	64.8
0.377	37.6	38.4	65.8
0.456	33.3	39.4	66.0 +
0.755	24.8	40.4	66.0 +
1.58	66.0 +	42.4	66.0 +
		44.4	66.0 +
		46.4	66.0 +

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5. CONCLUSIONS AND RECOMMENDATIONS

5.1 CONCLUSIONS

(1) THE CV-5 PERFORMED SATISFACTORILY DURING THE CURSORY EVALUATION. THE CV-5 COMPARES FAVORABLY WITH THE CV-2A IN ALL AREAS, EXCEPT ~~ING~~ DC INPUT POWER REQUIREMENTS.

(2) THE CV-5 PROVIDES GREATER FREQUENCY RANGE COVERAGE AND HAS BETTER 10 dB S/N SENSITIVITY THAN DOES THE CV-2A.

(3) THE CV-5 RESPONSE TO UNWANTED SIGNALS IS SIMILAR TO THAT OF THE CV-2. HOWEVER, IT WAS OBSERVED DURING THE SENSITIVITY MEASUREMENTS THAT THE CV-5 AND TEST RECEIVER RESPONDED TO SPURIOUS SIGNALS. THE SPURIOUS SIGNALS PRODUCED A RECEIVER OUTPUT SLIGHTLY ABOVE OR BELOW THE RECEIVER DIAL FREQUENCY. FOR EXAMPLE WITH THE CV-5 TUNED TO 13.0 MC AND WITH THE RECEIVER DIAL FREQUENCY SET AT 1500 KC, THE OUTPUT OF THE RECEIVER EXHIBITED BEAT NOTES WHICH BLANKED OUT THE WANTED SIGNAL FREQUENCY. THIS CONDITION WAS REDUCED BY SHIFTING THE RECEIVER DIAL FREQUENCY TO A NEW POINT ABOVE/BELOW 1500 KC WHERE A

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CLEAR CHANNEL COULD BE OBSERVED. THIS CONDITION WAS OBSERVED ON BOTH BANDS AND DID NOT OCCUR AT ALL TEST FREQUENCIES.

5.2. RECOMMENDATIONS (THE CV-5 TESTED IS AN ENGINEERING MODEL; MOST OF THE FOLLOWING RECOMMENDATIONS WILL NORMALLY, BE INCORPORATED IN THE PROTOTYPE MODEL). FUTURE CV-5 MODELS CAN BE IMPROVED AS FOLLOWS:

MECHANICAL

(1) THE BATTERY TERMINALS SHOULD BE MARKED.

(2) THE THREADED DIE CAST COVER SCREW LUG SHOULD BE MOVED SO THAT THE RF TRANSFORMER SHIELD DOES NOT BIND AGAINST THE LUG.

(3) THE DIAL SLOTS SHOULD BE ROTATED 90° SO THAT THE OPERATOR CAN DIRECTLY SEE THE DIAL SCALE.

(4) THE PRINTED CIRCUIT BOARD SHOULD BE LIFTED OFF GROUND SO AS TO AVOID COMPONENT "SHORTS."

(5) THE SCHEMATIC SHOULD BE CORRECTED.

ELECTRICAL

NO RECOMMENDATION IS GIVEN CONCERNING THE UNWANTED SIGNAL RESPONSE OF THE CV-5 BECAUSE THE PROBLEM IS EXTREMELY COMPLEX AND COULD BE TOLERATED FOR MOST CV-5 OPERATIONAL APPLICATIONS.

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